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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,513	03/10/2004	Brian S. Higgins	1340-012	4226

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EXAMINER	
COCKS, JOSIAH C	

ART UNIT	PAPER NUMBER
3749	

DATE MAILED: 08/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/797,513	HIGGINS, BRIAN S.	
	Examiner	Art Unit	
	Josiah Cocks	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *RCE filed 7/3/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 17-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 17-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination ("RCE") under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's RCE submission and accompanying amendment filed on July 3, 2006 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-8** are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,824,441 to Kindig ("Kindig").

Kindig discloses a method in the same field of endeavor as applicant's invention and as described in applicant's claims 1-8. In particular, Kindig describes a method of reducing the acidity of flue gas (e.g. NOx and SO3, see abstract) and lowering the temperature of the flue gas (see at least abstract and col. 6, lines 14-19, and col. 14, lines 45-54); partially combusting the fuel in a first state to create a reducing environment (see at least col. 6, lines 4-14 and col. 10,

lines 51-54); maintaining the reducing environment for a s sufficient time period such that reducible acids are reduced to achieve a desirable acidity concentration in the flue gas (see at least col. 12, line 54 through col. 13, line 23, note particularly equation 7); combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment in order to decrease the acidity of the flue bas by reducing the acid concentration of the gas (see at least col. 10, lines 43-49).

In regard to the recitation that the reducible acids are reduced "to a predetermined level" as now claimed, this limitation is considered met by Kindig. In Kindig, the reducible acids (i.e. at least the sulfur trioxides) are reduced by combination with a sulfur sorbent (i.e. one type disclosed being magnesium sulfur sorbent (see col. 13, lines 38-58 and col. 14, lines 35-54). Kindig specifically provides that the components of his method that allow for sulfur reduction, including removal of sulfur oxides from the combustion gases with sorbents (see col. 15, lines1-4) allow for "a particular sulfur reduction target" to be met (see col. 15, lines 4-7). Further, the sulfur reduction target is clearly stated to depend upon such factors as the amount and type of sorbent (see col. 15, lines 8-19). Accordingly, this "reduction target" is considered the "predetermined level" recited in applicant's claim.

Kindig also discloses micro-staging the first stage fuel combustion where the micro-staging is provided through the use of low NOx burners (see at least col. 12, lines 40-44), macro-staging the first stage of fuel combustion where the macro-staging is provide through the use of over-fired air (see col. 10, lines 43-46), combinations of the two staging techniques, and the fuel is coal (see col. 1, line 16).

Accordingly, all the limitations presented in claims 1-8 are considered to be anticipated by the disclosure of Kindig.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 17-32** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,824,441 to Kindig ("Kindig") in view of U.S. Patent No. 4,196,057 to May et al. ("May").

Kindig discloses substantially all of the limitations of the methods recited in claims 17-32 (note the discussion of the teachings of Kindig above which are hereby incorporated into the rejection of claims 17-32).

In regard to claim 17, the acid of concentration of the flue gas is directly related to the acid dew point temperature of the flue gas. This is expressly noted by applicant in applicant's description of the prior art, namely "...as the SO3 concentration increases, the acid dew point temperature of the flue gas increases." (see applicant's specification, p. 1, lines 16-18). To further support this assertion the examiner also points to May. May discloses a method which provides that "[m]easurement of dew point enables a semi-quantitative determination of the sulfur trioxide concentration in the exhaust or flue gas" (see May, col. 5, lines 30-32 and 38-42). Accordingly, a person of ordinary skill in the art would understand that reduction of the acid

concentration of the flue gas necessarily results in the lowering of the acid dew point level of the flue gas. As noted above, Kindig provides for the reduction of sulfur oxides from the effluent of flue gas of a furnace to a "reduction target." Therefore, a person of ordinary skill in the art would reasonably understand that obtaining the reduction target of the oxides in the flue gas as specified in Kindig would necessarily result in a corresponding desired dew point level (again see at least May, col. 5, lines 38-42).

In regard to claims 18-24, these limitations are present in Kindig. Note the application of Kindig to claims 2-8 above, which include limitations corresponding to those of claims 18-24.

In regard to claim 25, this claim includes limitations similar to that of claim 17 with the additional method step of "measuring the acid dewpoint of the flue gas." Kindig possibly does not expressly disclose actively measuring the acid dewpoint of the flue gas.

However, May, as previously noted, clearly provides that the dew point of the exhaust gas is measure to determine a concentration of sulfur trioxide (see May, col. 5, lines 30-32). Further, May provides that the measurement of the dew point also allows for determination of "cold end" corrosion locations (May, col. 5, lines 32-34) and further that the inherent corrosion rate measurement that arises form the dewpoint measurement "indicates the degree of inhibition of an additive such as magnesium and the actual condition at the surface." (May, col. 5, lines 34-37).

Accordingly, as Kindig clearly provides for the addition of Magnesium as a sorbent in order to achieve sulfur reduction (see Kindig, at least col. 12, lines 54-65 and col. 15, lines 1-7) a person of ordinary skill in the art would desirably modify the method of Kindig to incorporate

measuring the acid dewpoint of the flue gas as taught in May to determine the level of corrosion that results from the adding Magnesium to the flue gas (see May, col. 5, lines 30-37).

In regard to claims 26-32, these limitations are present in Kindig. Note the application of Kindig to claims 2-8 above, which include limitations corresponding to those of claims 26-32.

Response to Arguments

6. Applicant's arguments filed 7/3/2006 have been fully considered but they are not persuasive.

Applicant argues that Kindig teaches raising the acid dewpoint by increasing the formation of sulfur trioxide in the flue gas. In support of this argument applicant cites to column 13, lines 16-22 of Kindig (see response, p. 6). However, the examiner notes this is not an accurate characterization of the method disclosed by Kindig. The entire purpose of this method is to obtain **sulfur reduction**. Kindig specifically notes that in order to obtain this sulfur reduction two components are realized, one of which being removing sulfur oxides from combustion gases with sorbents (see Kindig, col. 15, lines 1-5). As explained by Kindig (see col. 12, line 60 through col. 13, line 22) this reduction occurs through the initial increase in sulfur oxides which in turn are reacted with the magnesium sorbent to result in an overall reduction of sulfur oxides. Applicant has merely cited to the sections of Kindig that describe this initial increase in sulfur oxides without the considering the further steps that result in the reduction of sulfur oxides.

Applicant further makes the following statement: "Kindig is only concerned with increasing sulfur trioxide and precipitator function." (see response, p. 7). However, as noted

above, this is clearly not an accurate characterization of the teachings of Kindig. Kindig's invention is concerned with reducing undesirable emissions, such as sulfur oxides from the flue gas of a combustion device (see at least Kindig, abstract and col. 15, lines 1-7). As one would expect, to achieve this purpose Kindig ultimately describes the reduction of sulfur trioxides (see claim 1 of Kindig).

Applicant also makes the following statement in discussing equation 7 of column 12 of Kindig: "Equation 7 shows the reaction of a magnesium-based sorbent with a sulfur trioxide, it shows the binding of sulfur trioxide rather than the claimed reduction of sulfur trioxide. This statement is unclear. Is applicant suggesting that as a result of the reaction identified in this equation sulfur trioxides are still present? This does not appear to accurately describe the plain result of Equation 7. Further, Kindig makes clear that the result of the addition of the sorbent results in sulfur reduction (See Kindig, col. 15, lines 1-7). Accordingly, this argument is not persuasive.

Therefore, applicant's claims 1-8 and 17-32 do not patentably distinguish applicant's invention over the prior art of record.

Conclusion

7. This action is made non-final. A THREE (3) MONTH shortened statutory period for reply has been set. Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Josiah Cocks whose telephone number is (571) 272-4874. The examiner can normally be reached on weekdays from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg, can be reached at (571) 272-4828. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jcc
July 22, 2006

JOSIAH COCKS
PRIMARY EXAMINER
ART UNIT 3749